

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named
Inventor : G. Herbert Lin

Appln. No. : 09/922,459

Filed : August 3, 2001

For : METHOD AND APPARATUS FOR
PROVIDING AN EARLY WARNING OF
THERMAL DECAY IN MAGNETIC
STORAGE DEVICES

Docket No.: M142.12-0017/STL 7502

Appeal No. ---

Group Art Unit: 2627

Examiner:

Dismerly E. Mercedes

REPLY BRIEF

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Sir:

This is in response to the Examiner's Answer dated March 20, 2008. This Reply Brief only addresses a general argument that the Examiner has used to support the rejection of the independent claims under 35 U.S.C. §103, and is not meant to override arguments made under separate groups of separately patentable claims in the Appeal Brief.

In section 10 (Response to Argument section) of the Answer, the Examiner, in general, suggests that, although Alex does not disclose performing a refresh operation by reading a test pattern on a track that has a different density than user data on the track, Quack teaches that data can be recorded at different densities in different zones of a storage medium, and therefore the combination of Alex with Quack would render, writing a refresh pattern having a different density than user data, obvious to one of ordinary skill in the art. Appellant respectfully asserts that this conclusion does not follow logically from the teachings of Alex and Quack.

Alex discloses an apparatus and method that writes data to a storage medium, e.g., a magnetic medium (such as a hard disk, a floppy disk, or a tape), and refreshes the data prior to the occurrence of a non-recoverable error (also called "hard" error) in the data. In some embodiments of Alex, the apparatus and method perform the refresh operation on user data when a refresh indicator satisfies a predetermined condition. In other embodiments, the refresh

operation is carried out without the use of a refresh indicator. Column 2, line 66, through column 3, line 10, of Alex, which are included below, describe such other embodiments.

Instead of using a refresh indicator, other techniques can be used in other implementations. For example, data can be refreshed periodically (e.g. once a day), regardless of the amount of degradation in the data (e.g. without performing an off-line scan). As another example, a refresh operation may be performed in response to a predetermined event, such as the detection of a soft error. Alternatively, two amplitudes may be compared, wherein a first amplitude is of the to-be-refreshed data, and a second amplitude is of a test signal that has just been written, thereby to determine if there is a loss of amplitude by a predetermined amount (and if so, a refresh operation is performed).

None of the embodiments disclosed in Alex include anything about data densities of user data and/or any other test signal used in the refresh operation, much less that a test signal on a track has a different data density than user data on the track.

Quak fails to teach or suggest storing user data on a disk, then writing a test pattern on the disk with different data density than the user data. Instead, Quak determines the initial bit density for each head by writing test tracks with the head using different bit densities, then determines an initial total capacity for the disk drive, then provides an adjusted total capacity for the disk drive that is closer to a desired capacity for the disk drive by adjusting bit density and/or track density, and then provides the disk drive to an end user. Quak says nothing about using a test pattern for a refresh operation or any other operation that involves user data.

Quak fails to teach or suggest adjusting the data density of the test signal in Alex. There is also no motivation to do so since the refresh operation is performed on user data after the storage capacity is set and the disk drive is provided to an end user. Likewise, there is no motivation to do so since the refresh operation reads the test signal immediately after it is written. Moreover, using a second test signal with different data density than the user data would disrupt the refresh operation since the refresh indicator (predetermined fraction) is based on a graph (such as graph 3, 4, or 5 in Fig. 1) at a fixed data density (such as 400, 300 or 200 kFCI), thereby rendering Alex unsatisfactory for its intended purpose.

In view of the foregoing and the arguments presented in the Appeal Brief, Appellant respectfully requests that the Board reverse the Examiner and find all pending claims allowable.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: /Alan G. Rego/
Alan G. Rego, Reg. No. 45,956
Suite 1400
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone:(612) 334-3222 Fax:(612) 334-3312

AGR:akb